

Evaluation of endoscopy and pathology findings in pediatric patients with chronic dyspeptic complaints

Evaluation of endoscopy and pathology findings

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Abstract

Aim: Upper gastrointestinal system endoscopy findings serve as a basis for starting treatment based on the cause and severity of dyspepsia. Helicobacter pylori (*H. pylori*) is becoming prevalent in both pediatric and adult patients. We aim to evaluate and discuss the endoscopy and pathology findings in pediatric patients with chronic dyspeptic complaints.

Material and Methods: This study evaluates the endoscopy and pathology findings of 163 pediatric patients who have undergone upper gastrointestinal system (GIS) endoscopy due to chronic dyspeptic complaints. The patients were assigned to four different groups according to their complaints. The underlying complaints as well as endoscopy and pathology findings were compared. Potential links with *H.pylori* were also investigated.

Results: A breakdown of complaints at the time of admission suggests that 53 (32%) patients had epigastric pain, 49 (30.2%) postprandial fullness/discomfort, 32 (20.3%) nausea and vomiting, and 29 (17.2%) upper abdominal distension. The most common endoscopy findings were antral hyperemia (42.3%) and antral nodularity (21.4%). Esophagitis was present on endoscopy in 14.1% of the patients with dyspeptic complaints. Antral gastritis and esophagitis were more common in *H. Pylori*-positive patients. There was no statistically significant relationship between *H.Pylori* and the presence of alkaline reflux.

Discussion: Antral hyperemia, antral nodularity, and esophagitis are common in endoscopic findings of *H. Pylori*-positive patients with dyspeptic complaints. Although the relationship between duodenogastric reflux (alkaline reflux) and *H.pylori* is not known, no link was evident in the present study. The incidence of *H.pylori* has risen among children, and symptomatic children should receive treatment to prevent chronic complications.

Keywords

Dyspepsia, Endoscopy, Child, Helicobacter, Esophagitis, Gastritis

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Introduction

Symptoms such as upper GI bloating, epigastric pain, early satiety, nausea, vomiting, and burning are called dyspepsia. They can also present with acute, chronic, or recurrent abdominal pain in pediatric patients. This condition is associated with dyspepsia in some pediatric patients who report nonspecific chronic abdominal pain at the time of admission. Although dyspepsia is prevalent at a high rate of 20% to 30%, only 25% of patients apply to medical institutions. Functional dyspepsia constitutes a significant part of dyspepsia. Today, upper GI endoscopy is widely popular in distinguishing functional and organic dyspepsia both in children and adults. Gastritis, peptic (gastric and duodenal) ulcer, gastroesophageal reflux, duodenogastric reflux (DGR), and esophagitis constitute a significant part of the organic causes. The increasing use of endoscopy for pediatric patients has led to an increase in the diagnosis of peptic ulcer, gastritis, and gastric erosion [1].

Recent studies in children have displayed that the prevalence of peptic ulcers has risen from 1.8% to 19.5% [2]. Peptic ulcer and gastric erosion have been reported in 10-20% of symptomatic children who underwent upper GI endoscopy [3]. The peptic ulcer is usually associated with *H.pylori*, corticosteroids or non-steroidal anti-inflammatory (NSAID) drugs, systemic diseases, and nutrition [4]. Moreover, *H. pylori* are the main factor responsible for chronic gastritis and duodenal ulcer in adults and children [5]. Through various pathophysiological mechanisms, *H.pylori* causes dyspeptic symptoms without causing inflammation and ulceration in the gastrointestinal tract. An improvement in symptoms due to *H.pylori* treatment has been observed [6,7].

This study aims to analyze the dyspeptic symptoms with characteristics of endoscopy and pathology findings in pediatric patients, and to discuss the relationship between the presence of *H.pylori* and these findings.

Material and Methods

This study is a retrospective and observational study. Written informed consent was provided by the families of all participants. Approval from the local ethics committee of Taksim Training and Research Hospital was received on 16.01.2019 (no:2). The study procedure followed the Helsinki Declaration and Good Clinical Practice guidelines.

Selection of the patient population

This study was conducted by analyzing the case records of 163 pediatric patients aged between 7-18 years who applied due to chronic dyspeptic complaints between 2017 and 2018 and underwent upper GI endoscopy.

Inclusion criteria:

Upper GI endoscopy was performed due to dyspeptic complaints for a minimum of six months and complaints about meals either at least once a week or persistently in the last three months. Patients who did not previously undergo endoscopy due to chronic dyspeptic complaints were included in the study. Admission complaints, endoscopy findings, and pathology findings were then analyzed.

Exclusion criteria:

Patients who had undergone endoscopy, treatment for *H.pylori* in the last three months, gastrointestinal system surgery,

underlying hematological diseases, diabetes mellitus, thyroid disease, congenital heart disease, and received antacid therapy were left out.

Endoscopic evaluation

Endoscopy procedures of the patients were performed using the EG530WR Endoscopy (Fujinon, Tokyo, Japan) device. Families provided verbal and written consent before the endoscopy. All patients were fasted for at least 6 hours before endoscopy. The anesthesiologists administered midazolam (0.1 mg/kg), ketamine (1 mg/kg), or propofol following local anesthesia with pharyngeal xylocaine. Once the patient was sedated, endoscopic procedures were performed. During endoscopy, the esophagus, cardia, fundus, corpus, and antrum regions of the stomach and duodenum were examined in detail. Pyloric dysfunction and gastric emptying were analyzed. During the endoscopic examination, signs of gastritis, hyperemia, fragility, edema, nodularity, gastric and duodenal ulcers, erosion, mass, bleeding, hiatal hernia, lower esophageal sphincter, and duodenogastric reflux (alkaline reflux) were examined and recorded. Endoscopy data for each patient were registered in a catalog of written documents and photographs.

Histopathological Evaluation

At least two biopsy samples were taken from the esophagus, stomach corpus, antrum regions, and duodenum during the endoscopy procedure. Biopsies taken from the antrum and corpus were evaluated especially for the presence of *H.pylori*. Biopsy samples were fixed in 10% neutral buffered formalin. Hematoxylin-eosin and giemsa staining were performed by the pathology department. It was marked with periodic acid schiff and alcian blue (PAS-AB) for the evaluation of *H. pylori* and the presence of intestinal metaplasia. Histopathological evaluation was carried out per Sydney classification [8,9].

Statistical analysis

Statistical Package for Social Sciences (SPSS) Version 20.0 was used. The normality condition was checked with the Kolmogorov-Smirnov test. The relationship between qualitative variables was investigated using the chi-square analysis. Age of nausea and vomiting, epigastric pain, postprandial fullness, and bloating groups were compared with the Kruskal-Wallis H test since age values among the groups did not follow normal distribution. Therefore, the descriptive statistics of this variable among the groups were displayed as median (25% - 75% percentiles). Descriptive statistics for qualitative variables were expressed as frequency (n) and percent value (%). A p-value of <0.05 was considered statistically significant.

Results

This retrospective observational study included 163 Pediatric patients aged between 7 and 18 years; 68 patients (41.7%) were male, and 95 (58.3%) were female. The mean age of the patients was 13.34±2.41 years.

There was no significant difference in terms of age or gender based on the complaints of the patients ($p=0.552$ and $p=0.339$, respectively). The patients were divided into four groups based on their complaints. The most common complaints were epigastric pain 32.5% and postprandial fullness 30%. The most common endoscopy findings were antral hyperemia (42.3%) and antral nodularity (21.4%) (Table 1). Endoscopic findings were

found to be normal in 17.7% of the patients. Esophagitis was detected in 14.1% of the patients who applied with dyspeptic complaints. The most common esophagitis and alkaline reflux were observed in patients with epigastric pain. There was no statistically significant correlation between the patients' initial complaints and the endoscopy findings (p=0.809).

The most common pathology findings were antral gastritis (46.6%) and pangastritis (30.6%). Esophagitis was most common in patients with epigastric pain. Eosinophilic and reflux esophagitis were also most frequent in patients with epigastric pain. Eosinophilic esophagitis and reflux esophagitis were observed in 4.2% and 9.8% of the cases, respectively. The pathology results of 13.4% of the patients with dyspeptic complaints were found to be normal. (Table 2). H.pylori was positive in 44.1% of the patients. There was no statistically significant relationship between the complaints at admission

and the pathology findings.

When H. Pylori positive and negative patients were compared, the most common endoscopy finding was antral hyperemia (51.4%) and antral nodularity (27.8%). The presence of H. Pylori was associated with esophagitis in endoscopy and pathology. Eosinophilic esophagitis and reflux esophagitis were more common in H.pylori-positive patients. However, no correlation was found in patients with positive H.pylori in terms of the type of esophagitis (Table 3).

Discussion

19% of the pediatric population complain of chronic or recurrent abdominal pain. Only 10% of these have findings for a specific diagnosis [10]. In this study, antral gastritis was detected in 47.2% of pediatric patients with epigastric pain, 35.8% had pangastritis, and histopathology results were normal in 9.4%

Table 1. Comparison of patients' complaints and endoscopy results

	Complaint at admission				P
	Nausea and Vomiting (n=32)	Epigastric pain (n=53)	Postprandial fullness (n=49)	Bloating (n=29)	
Age (year)	12 (11.50-15)	14 (11.50-15)	14 (12.50-15)	13 (11-15)	0.552
Age (year)	13.9±2.44	13.36±2.0	13.69±2.42	12.90±2.43	-
Gender					
Male	10 (31.2)	20 (37.7)	24 (49)	14 (48.3)	0.339
Female	22 (68.8)	33 (62.3)	25 (51)	15 (51.7)	
Endoscopy findings					
Normal	5 (15.6)	9 (17)	10 (20.4)	5 (17.2)	0.809
Gastric erosion	5 (15.6)	6 (11.3)	2 (4.1)	4 (13.8)	
Antral hyperemia	14 (43.8)	19 (35.8)	23 (46.9)	13 (44.8)	
Antral nodularity	6 (18.8)	14 (26.4)	10 (20.4)	5 (17.2)	
Duodenitis	0 (0)	0 (0)	0 (0)	1 (3.4)	0.350
Peptic ulcer	2 (6.3)	5 (9.4)	4 (8.2)	1 (3.4)	
Esophagitis*	6 (18.7)	10 (18.8)	4 (8.1)	3 (10.3)	0.517
Alkaline Reflux*	4 (12.5)	9 (17)	6 (12.2)	7 (24.1)	

Descriptive statistics are expressed as median (25% – 75% percentiles), mean±standard deviation, and n (%). * Since esophagitis and alkaline reflux may accompany other endoscopy findings, they are also mentioned.

Table 2. Comparison of patients' complaints and pathology results

	Complaint at admission				P
	Nausea and Vomiting (n=32)	Epigastric pain (n=53)	Postprandial fullness (n=49)	Bloating (n=29)	
Age (year)	12 (11.50-15)	14 (11.50-15)	14 (12.50-15)	13 (11-15)	0.552
Age (year)	13.19±2.44	13.36±2.0	13.69±2.42	12.90±2.43	-
Gender					
Male	10 (31.2)	20 (37.7)	24 (49)	14 (48.3)	0.339
Female	22 (68.8)	33 (62.3)	25 (51)	15 (51.7)	
Pathology Findings					
Normal	3 (9.4)	5 (9.4)	11 (22.4)	3 (10.3)	0.602
Duodenitis	5 (15.6)	4 (7.5)	3 (6.1)	3 (10.3)	
Pangastritis	10 (31.3)	19 (35.8)	13 (26.5)	8 (27.6)	
Antral gastritis	14 (43.8)	25 (47.2)	22 (44.9)	15 (51.7)	
Esophagitis	6 (18.8)	10 (18.9)	4 (8.2)	3 (10.3)	0.350
Esophagitis type					
Eosinophilic	2 (33.3)	3 (30)	1 (25)	1 (33.3)	-
Reflux	4 (66.7)	7 (70)	3 (75)	2 (66.7)	
H.Pylori	12 (37.5)	25 (4.2)	19 (38.8)	16 (55.2)	0.428

Descriptive statistics are expressed as median (25% – 75% percentiles), mean±standard deviation, and n (%).

Table 3. Breakdown of H. Pylori presence and comparison between endoscopy and pathology findings

	H. Pylori		P
	Positive (n=72)	Negative (n=91)	
Endoscopy findings			
Normal	3 (4.2) ^a	26 (28.6) ^b	0.002
Gastric erosion	7 (9.7) ^a	10 (11) ^a	
Antral hyperemia	37 (51.4) ^a	32 (35.2) ^b	
Antral nodularity	20 (27.8) ^a	15 (16.5) ^a	
Duodenitis	0 (0) ^a	1 (1.1) ^a	
Peptic ulcer	5 (6.9) ^a	7 (7.7) ^a	
Esophagitis ¹	17 (23.6) ^a	6 (6.6) ^b	
Pathology findings			
Normal	4 (5.6) ^a	18 (19.8) ^b	0.014
Duodenit	7 (9.7) ^a	8 (8.8) ^a	
Pangastritis	19 (26.4) ^a	31 (34.1) ^a	
Antral gastritis	42 (58.3) ^a	34 (37.4) ^b	
Esophagitis ²	17 (23.6) ^a	6 (6.6) ^b	0.004
Esophagitis type			
Eosinophilic	7 (41.2)	0 (0)	0.124
Reflux	10 (58.8)	6 (100)	
Alkaline Reflux	14 (15.4)	12 (7.4)	0.995

Descriptive statistics are expressed as n (%). Similar letters in the same line indicate the similarity between the percentages, and different letters indicate the difference between the percentages. ¹indicates esophagitis on endoscopy. ²indicates patients with esophagitis as a result of pathology.

of the patients. This finding supports the fact that abdominal pain due to functional dyspepsia is also common in children.. Endoscopic imaging of the upper gastrointestinal tract is a simple, less time-consuming, and low-complication diagnostic tool, which makes it possible to observe macropathologies, start necessary treatment, and obtain a biopsy for micropathologies, especially H.pylori [11,12]. The nodular and hyperemic feature of the mucosa in the antrum of the stomach, and the endoscopic appearance, which is sometimes called the salt-and-pepper appearance, is highly associated with H.pylori gastritis [13,14]. In our study, antral hyperemia was associated with H.pylori (p=0.002). In a study conducted with pediatric patients, antral nodular appearance was found in 48 (52%) patients with H.pylori gastritis, antral hyperemia was detected in 27 (29%), and a normal endoscopic image in the antrum and corpus was the case in 18 (19%) patients [15]. In a study conducted in Turkey, the most common endoscopic finding in patients infected with H. pylori was reported as erythematous pangastritis (82%) [16]. In a study by Ozcay et al. [17] on 102 children with H.pylori gastritis, 66 (64.7%) had an antral nodular appearance, 6 (5.9%) antral hyperemia, 2 (1.96%) duodenal ulcer, and 28 patients had normal endoscopic findings (27.5%). It shows us the importance of taking a biopsy sample if H.pylori is suspected, even if the macroscopic appearance is normal during upper GI endoscopy as H.pylori can cause dyspeptic complaints by functionally affecting GIS without causing pathological disorders in the GIS. Moreover, in this study, improvement in abdominal pain and dyspeptic complaints were observed with H.pylori eradication treatment. Symptomatic H. pylori infections should be treated for preventing complications of H. pylori in children and adults. Duodenogastric reflux (DGR) or alkaline reflux is the passage of duodenal contents from the duodenum to the stomach.

Although DGR is quite common after cholecystectomy, pyloroplasty, and gastric surgery, it can also develop primarily due to pyloric insufficiency without a secondary cause. Complaints such as epigastric pain, pain in the retrosternal region, and bile vomiting may develop after DGR, or they may be asymptomatic. Ulceration, erosion, hyperemia, and excessive bile in the stomach (especially in patients with abdominal pain) in upper GI endoscopy are the clinical findings of DGR. However, it is still unclear whether primary DGR causes histopathological changes in the upper GIS in children [18]. It has been reported that short-term reflux of duodenal contents into the stomach during physiological events may rarely cause symptoms. Taşkın et al. [19] found no significant difference between patients with and without DGR concerning chronic inflammation in the gastric biopsy. There are conflicting results concerning the prevalence of H.pylori in children with DGR. In this study, there was no relation between the presence of H.pylori and alkaline reflux. Similarly, in another study, no statistically significant difference was detected between groups with and without DGR in terms of H. pylori prevalence or density [20]. On the other hand, Adam et al. [21] reported that DGR (alkaline reflux) elevated H.pylori in their study involving 1120 pediatric patients.

Nausea and vomiting are associated with H. pylori infection in studies conducted in developing countries [22]. A cross-sectional seroepidemiological study conducted in school children in Italy suggested that nausea and vomiting were positively associated with H. pylori infection (OR 2.2) [23]. In our study, a significant relationship between esophagitis and H.pylori is also evident. This situation can be attributed to H.pylori increasing dyspeptic symptoms and causing inflammatory response. In recent studies, the relationship between eosinophilic esophagitis and H.pylori is also noteworthy [24]. The incidence of Eosinophilic esophagitis in children under the age of 18 who underwent upper GI endoscopy due to abdominal pain was as high as 6%; 3.7% of 376 children who had resistant dyspeptic symptoms were diagnosed with eosinophilic esophagitis resistant to treatment [25]. Similarly, in our study, the prevalence of eosinophilic esophagitis was 4.2% in children with dyspeptic complaints.

Limitations:

This study presents certain limitations. The patients could be divided into groups based on the duration and severity of dyspepsia for intergroup comparisons. In addition, organic and functional dyspepsia could be compared in terms of H.pylori, and its features could be brought to discussion. Therefore, studies with longer duration and higher number of patients are necessary.

Conclusion:

Today, chronic dyspepsia is common in the childhood age group, and in cases where no response to treatment is obtained, endoscopic imaging of the upper gastrointestinal tract and biopsy should be taken. H. Pylori is also common in children with chronic dyspeptic complaints. H.pylori should also be investigated in cases of dyspepsia that are unresponsive to proton pump inhibitors and H2-receptor blockers.

The relation of H.pylori with diseases such as autoimmune gastritis and eosinophilic esophagitis, in which inflammation is at the forefront, continues to be a subject of investigation.

In this study, the relationship between esophagitis and H.pylori draws particular attention.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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